Radius Systems Guidance for Cutting Polyethylene Pipes

Polyethylene pipe cutting tools

Polyethylene in pipe is a light-weight but a tough and durable material that often requires cutting to length when service laying and mainlaying and prior to joining. For electrofusion jointing, cut ends of the pipe should be straight and clean to allow the pipe to be inserted squarely up to the socket pipe stops.

When Butt fusion jointing, squarely cut pipe ends will minimise the trimming process, which on large diameter size pipes can unnecessarily lengthen the welding process. This document is provided for guidance on the recommended pipe cutting tools available. Users should familiarise themselves with the correct use of the tooling in accordance with the manufacturer's instructions and in accordance with a suitable risk assessment.

Service size pipes 20 - 63mm

Polyethylene pipe cuts are easily achieved with small service size diameter pipes up to 63mm. There are a range of cutters that are easy to handle and operate and produce good results. See below a hand held cutters, provided they are kept in good condition and fit for purpose, they will provide a clean and straight cut up to 32mm. Larger devices of a similar style are available up to 63mm.

Common design of service pipe, hand-held pipe cutter.

Mid range pipe sizes 63 -200mm

In pipe ranges from 63mm to 200mm pipe cutting tools increase somewhat in variety. A pipe operator will normally use what is readily available and easy to use which is often a hand saw. A hand saw is flexible to use over large range of pipe sizes and requires only minimal training, when used by a skilled operator a straight cut can be achieved consistently, when completed with suitable clearance around the pipe.

As diameter and wall thickness increase a straight cut is more difficult to achieve and the hand saw usually leaves a rough end surface, which requires further preparation to clean the pipe end.

Also available in this size range are rotary cutters which do provide the operator with a clean and straight cut. They are dependent on clearance when cutting in the trench and outside the trench the pipe will need to be restrained, but often give a much better result than a hand saw.

The guillotine cutter is also widely used to achieve a clean straight cut, the advantage of this is the operator can keep his hands clear of the cutting action. The guillotine cutter can cause deformation of the pipe which would need to be corrected before joint preparation.

Mid diameter pipe size cutting options, rotary cutter, guillotine cutter and hand saw.

Large diameter Pipes 250-630mm

On larger diameter pipes there is a further range of cutting tools from pipes from 250mm up to 710mm. There is some cross over from mid range sizes due to the flexibility of handsaws but as wall thickness increases with size then cutting pipes accurately with a hand saw becomes very difficult and the results are determined by the skill and strength of the operator.

Large diameter pipes often require cutting with powered equipment that requires some level of training and guidance, and the process of cutting polyethylene pipes becomes more of a planned operation that requires a greater depth of risk assessment.

The operator has to consider not only if the available tool is capable of producing a straight and clean cut, but also can the cutting operation be carried out safely in the site operating environment. Electrical equipment would not be suitable on 'live gas' operations if not intrinsically safe. For this reason pneumatic powered tools are most advantages.

The types of cutting tools are shown below, an alligator saw is a popular site tool but is 110v electrically powered and has a large area of exposed blade so is not ideal for all situations. Jigsaw cutters are available in 110v, battery and pneumatic drive, are best used provided the operator has a pre marked pipe and clearance for working around the pipe.

An Alligator saw, a Rotary pipe cutter and a jigsaw.

The easiest tool to use is a pneumatic rotary pipe cutter that is capable at sizes from 400mm to 800mm in diameter and up to 42mm in wall thickness. There are a variety of manufacturers of this type of cutter. A skilled and competent operator will achieve a straight edge on each cut. Tooling images are for indication only.

Generally safety guidelines to cutting large diameter pipes are :-

- Ensure the cutting operation is correctly planned and risk assessed.
- Ensure the tooling is intrinsically safe when operating on live gas sites.
- The operator should be fully trained and competent to use the equipment correctly, using the manufacturer's instructions.
- Ensure the correct PPE is available for use, as advised by the risk assessment.
- Ensure the tooling is in good serviceable condition.
- Ensure that any guarding fitted, remains in position.
- Ensure cutting tools are fitted with the correct blade.
- Where necessary mark the position to be cut around the circumference of the pipe, to ensure a straight cut is made.
- Support the pipes to be cut and ensure there is adequate clearance around the pipe for the tooling being used.
- Use a ground sheet to ensure any swarf or shavings are removed from the environment

When cutting Polyethylene pipes on site, above ground, the pipe should be fully supported and secured for the cut. The pipe should be positioned at a working height that is comfortable for the operator, where practical, and also to allow clearance around the pipe.

The cutting operation should be carried out in a safe environment that is guarded and isolated from the public or in an area that is supervised by personnel not completing the cut, who can warn other personnel of the activity being carried out.

When Polyethylene is being cut from an existing laid pipeline i.e. to replace a damaged section of pipe, the pipe should be supported below the pipe and at the sides to restrain any constrained forces in the pipeline. In this situation it is recommended that three cuts are made in the pipe to ensure that the initial cut section does not become trapped, and can easily be removed.

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